DOCUMENT RESUME

ED 399 135 SE 057 447

TITLE	Tapping the Source: A Listing of Groundwater Education Materials Available through the Groundwater Education in Michigan (GEM) Program. Updated.
INSTITUTION	Michigan State Univ., East Lansing. Inst. of Water Research.
SPONS AGENCY	Kellogg Foundation, Battle Creek, Mich.
PUB DATE	Mar 95
NOTE	36p.
AVAILABLE FROM	Groundwater Education in Michigan Program, Institute of Water Research, Michigan State University, 115 Manly Miles Building, 1405 S. Harrison Road, East Lansing, MI 48823-5243.
PUB TYPE	Reference Materials - Bibliographies (131)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Community Involvement; Conservation (Environment); *Educational Resources; Elementary Secondary Education; Environmental Education; *Groundwater; *Instructional Materials; Natural Resources
IDENTIFIERS	*Environmental Awareness

ABSTRACT

Established in 1988 through the cooperative efforts of the Institute of Water Research at Michigan State University and the W. K. Kellogg Foundation, the Groundwater Education in Michigan (GEM) program helps people understand the relationship between their actions and the quality of their environment, particularly groundwater. The program has a network of local community groups and universities across the state who initiate projects and share information about protecting this important resource. The educational materials in this listing include audio visuals, books/booklets, computer software, discussion papers, displays/models, fact sheets, manuals, newsletters, posters, student/teacher resources, and other resources. (JRH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 399 135

Tapping the Source:

A listing of Groundwater Education Materials available through the

Groundwater Education in Michigan (GEM) Program

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

R. Kline-Kobach

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

GROUNDWATER EDUCATION IN MICHIGAN

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

Updated March, 1995

SE057447

The Groundwater Education in Michigan (GEM) Program

Established in 1988 through the cooperative efforts of the Institute of Water Research at Michigan State University and the W.K. Kellogg Foundation, the Groundwater Education in Michigan (GEM) program helps people understand the relationship between their actions and the quality of their environment, particularly groundwater. The program has a network of local community groups and universities across the state who initiate projects and share information about protecting this important resource.

For additional copies or more information please contact:

Groundwater Education in Michigan
Institute of Water Research
115 Manly Miles Building
1405 South Harrison Road
Michigan State University
East Lansing, MI 48823-5243
(517) 355-0224

A Look Inside

Contents **Page**

Audio Visual	1
Booklets	3
Computer Software	6
Discussion Papers	7
Displays/Models	7
Fact Sheets	8
Manuals	11
Newsletters	12
Pamphlets	13
Posters	16
Student/Teacher Resources	17
Other Resources	20

Groundwater Education Materials

The Groundwater Education in Michigan (GEM) program

Audio Visual

Title: ***Agriculture and Groundwater Contamination: Problems & Prevention***
Organization: Natural Resources Conservation Service
c/o MSU Extension Bulletin Office (Bulletin # WQ40), Room 10B
Address: Agricultural Hall, MSU, East Lansing, MI 48824, (517) 355-0140.
Cost: $25.00 per copy
Description: *This 16 minute **video tape** describes the agricultural community's role in protecting groundwater. Potential groundwater contamination resulting from pesticide applications, fertilizer and livestock manure applications, and irrigation are explored. Best management practices to prevent or minimize contamination are also presented.*

Title: ***Constructing and Operating A Groundwater Flow Model***
Organization: Crawford County GET-GEM, 200 Michigan Avenue, Grayling, MI 49738, (517) 348-2841 **or** WMU Regional GEM Center, 3327 Rood Hall, Kalamazoo, MI 49008, (616) 387-4986
Cost: $39.95 plus $4.00 S/H
Description: *This **video and companion guidebook package** provides easy to follow, non-technical instructions for schools, organizations and individuals regarding the construction and operation of the groundwater flow model. The 90-minute video and guidebook cover the tools and materials needed for construction and techniques for operating the model as well as a description of the groundwater concepts that can be demonstrated.*

Title: ***Drinking Water: Quality on Tap***
Organization: League of Women Voters - Michigan (LWVMI)
Address: 200 Museum Drive, Lansing, MI 48933-1997, 1-800-292-5823
Cost: $40.00 (1/2" video, study guide & 100 informational brochures)
Description: *This 27-minute **video** features sources of water, types of drinking water supply systems, treatment methods, delivery, government drinking water regulations, home water treatment and bottled water.*

Title: ***Groundwater: A Precious Resource***
Organization: League of Women Voters - Michigan (LWVMI)
Address: 200 Museum Drive, Lansing, MI 48933-1997, 1-800-292-5823
Cost: Available on a loan basis
Description: *This 10-minute **video** features groundwater basics and problems, with focus on Livingston County.*

Title: ***Groundwater Protection: A Partnership in Agriculture***
Organization: Natural Resources Conservation Service
Address: 1405 South Harrison Road, East Lansing, MI 48823, (517) 337-6904
Cost: Available on loan basis
Description: *The relationship between agriculture and groundwater of rural areas, as well as the partnership between land owners and Conservation personnel, is the focus of this 11 minute* ***videotape.***

Title: ***Groundwater Protection: It's in Your Hands***
Organization: Michigan Environmental Council
Address: 115 West Allegan, Suite 10B, Lansing, MI 48933, (517) 487-9539
Cost: $4.00 per two-week loan. Arrangements can also be made for purchase
Description: *This 38-minute* ***videotape*** *provides regional information and highlights citizen initiatives to protect groundwater.*

Title: ***NEMCOG/GEM Slide Presentation***
Organization: Northeast Michigan Council of Governments (NEMCOG)
Address: P.O. Box 457, 123 West Main Street, Old Kent Bank Professional Building, Gaylord, MI 49735, (517) 732-3551
Cost: Available on loan basis
Description: *This groundwater* ***slide show*** *is intended for general citizen presentations.*

Title: ***Teen News Network: Groundwater Update***
Organization: MSU Extension Bulletin Office
Address: 10A Agriculture Hall, MSU, East Lansing, MI 48824, (517) 355-0240.
Cost: $50.00
Description: *This 13-minute* ***videotape*** *features a mock news format hosted by teens who address groundwater conservation and protection. The video can be shown in both formal and non-formal educational settings.*

Title: ***The Michigan Wellhead Protection Program: Communities in Action***
Organization: c/o Michigan State University Institute of Water Research
Address: 115 Manly Miles Building, 1405 S. Harrison, MSU, East Lansing MI 48823-5243, (517) 353-9709
Cost: $12.00 purchase, $5.00 rental
Description: *This 11-minute* ***video*** *highlights the seven elements of local wellhead protection programs that have been outlined by the Michigan Departments of Natural Resources and Public Health. The Village of Oxford is featured in the video as a model for local program implementation.*

*See also Student/Teacher Resources

Books/Booklets

Title: ***A Property Owner's Environmental Guidebook***
Organization: Northwest Michigan Council of Governments
Address: c/o Traverse City Board of Realtors, 852 South Garfield Avenue, Traverse City, MI 49684, (616) 947-2050
Cost: To be determined
Description: *Directed to both buyers and sellers of residential and small commercial properties, this 55-page booklet discusses protection of special resources, prevention and discovery of environmental contamination, and reducing risk of legal liability. Although targeted to the Grand Traverse region, the topics covered are applicable to other areas.*

Title: ***Building Leadership Teams for Resource Protection***
Organization: East Michigan Environmental Action Council (EMEAC)
Address: 21220 West 14 Mile Rd, Bloomfield Township, MI 48301, (810) 258-5188
Cost: $3.50
Description: *Written in 1993, this 23-page booklet describes how leadership teams can empower citizens to protect natural resources. Although examples are drawn from EMEAC's experience working with citizens on groundwater issues, the model can be applied to any natural resource.*

Title: ***Community Profile of Groundwater Issues: Livingston County***
Organization: League of Women Voters - Michigan (LWVMI)
Address: 200 Museum Drive, Lansing, MI 48933-1997, 1-800-292-5823
Cost: Available on a loan basis
Description: *Discussion of various groundwater issues by state and local experts. Topics addressed include water supply, solid and hazardous waste disposal, injection wells and planning concerns of local units of government.*

Title: ***Environmental Consultant Directory: A Guide to Selecting an Environmental Consultant in Michigan's Upper Peninsula.***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI 48331, (906) 487-3341
Cost: To be determined (< $10). U.P. residents can pick up copies free from GEM centers, county health departments, MSU Extension or DNR offices, or tribal environmental specialists.
Description: *A directory of more than 40 environmental/engineering consulting firms that serve the Upper Peninsula. Includes brief descriptions of the types of environmental services offered, suggestions for selecting a consultant and a sample request for proposals (RFP). November, 1994.*

Title: ***Exploring Groundwater: A Journey Through Time and Space in Van Buren County, Michigan***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986
Cost: $5.00, plus $2.00 S/H. Quantity discounts available
Description: *This color illustrated publication features information on groundwater in Van Buren County, Michigan and includes a guide for use by teachers.*

Title: ***Groundwater at Risk: A Citizen's Guide***
Organization: Michigan Environmental Council
Address: 115 West Allegan, Suite 10B, Lansing, MI 48933, (517) 487-9539
Cost: $5.50
Description: *Targeted toward Michigan citizens, this guidebook includes sections on groundwater basics, sources of groundwater contamination, underground storage tanks, oil and gas extractions, pesticides and fertilizers, solid waste, hazardous waste, mining, underground injection wells, sewers and septic systems, solutions and success stories, and resources for activists. An accompanying video entitled* ***Groundwater Protection: It's in Your Hands*** *is also available.* (see Audio Visual)

Title: ***Groundwater Protection: A Michigan Perspective***
Organization: League of Women Voters - Michigan (LWVMI)
Address: 200 Museum Drive, Lansing, MI 48933-1997, 1-800-292-5823
Cost: Available on a loan basis
Description: *Groundwater geology, threats, and regulatory framework as related to local planning and resource management. Presented as a lecture series.*

Title: ***Precious GEMs: Groundwater Education Strategies that Work***
Organization: W.K. Kellogg Foundation
Address: P.O. Box 5196, 180 South Union Street, Battle Creek, MI 49017-4918
Cost: Free
Description: *Written for teachers, regulators, nonprofit organizations, government officials and interested citizens, this booklet highlights groundwater education and protection program lessons that have been learned by the various organizations involved with the Groundwater Education in Michigan (GEM) Program.*

Title: ***Site Plan Review and Groundwater Protection: A Guidebook for Local Government Officials***
Organization: Clinton River Watershed Council
Address: 1970 E. Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: $6.00
Description: *This 51-page publication, geared for local officials, includes site plan review standards and administrative procedures for groundwater protection which were developed with Oakland and Macomb County communities and serve as a useful model for others.*

Title: ***Site Plan Review Standards for Groundwater Protection***
Organization: Clinton River Watershed Council
Address: 1970 E. Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: Free
Description: *This publication provides model ordinance standards and examples of environmental permits checklist and hazardous substances reporting forms currently used in Oakland and Macomb County communities.*

Title: ***Small Business Guide to Secondary Containment***
Organization: Clinton River Watershed Council
Address: 1970 E. Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: $6.00
Description: *Measures for secondary containment of hazardous substances stored above ground are included in this practical guidebook intended for local governments and public health inspectors to distribute to local businesses.*

Title: ***Walking on Water: The Life Story of Groundwater in St. Joseph County, Michigan***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986
Cost: $5.00, plus S/H Quantity discounts available
Description: *This illustrated booklet features creative graphics, maps and text on groundwater in St. Joseph County, Michigan and includes a poster guide on household hazardous waste management.*

Title: ***The Water Below: A Subterranean Saga of Groundwater in Calhoun County, Michigan***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986
Cost: $5.00, plus S/H. Quantity discounts available
Description: *This illustrated booklet features creative graphics, maps and text on groundwater in Calhoun County, Michigan and includes a poster guide on household hazardous waste management.*

Title: ***Oxford Village Wellhead Protection Plan***
Organization: Clinton River Watershed Council
Address: 1970 E. Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: $5.00 postpaid
Description: *Illustrated plan adopted by Oxford Village Council and submitted to the State of Michigan under state guidelines for wellhead protection. Includes listing of potential sources of contamination, management program, zoning for groundwater protection, and results of hazardous materials inspections conducted by the Oxford Fire Marshal.*

*Computer Software**

Title: ***Hydrotopia: A Computer Game***
Organization: Ecology Center of Ann Arbor
Address: 417 Detroit Street, Ann Arbor, MI 48104, (313) 995-5888
Cost: $49.95/1, $139.95/5-pack, $299.95/site license
Description: *This exciting interactive computer game has students and adults making decisions about household products and disposal, while trying to keep the community's water clean. Information about less-toxic products, disposal choices, and water impacts is imparted in a fun way. Requires a Macintosh computer, System 6.04 or higher. Color monitors need at least 2 MB of RAM; black and white monitors require 1 MB of RAM.*

Title: ***PEP-GEM Groundwater Helper***
Organization: Washtenaw County Metropolitan Planning Commission
Address: 110 N. Fourth Ave., Ann Arbor, MI 48107-8645, (313) 994-2435
Cost: To be determined
Description: *This Macintosh computer self-paced tutorial incorporates video footage and slides, narration, text and diagrams. Issues covered include groundwater basics (terms, concepts), contamination issues by land use sector (residential, agriculture, business and industry and general urbanization) and protection strategies, with a special section on groundwater protection strategies for local planning officials. Users can customize some screens with local program/contact information. Requires Macintosh computer - LC, II or Quadra families, 5MB Ram, 40 MB disk space, 8 bit color video, and System 7.0.1 or higher.*

Title: ***CalGEM Computer Program for Calhoun County***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986.
Cost: $10.00, plus $2.00 S/H
Description: *An interactive computer program with entertaining color graphics. Designed for secondary students and the general public.*

*See also Student/Teacher Resources

Discussion Papers

Title: ***Assessment of Spring Creek Aquifer Vulnerability to Pollution***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931, (906) 487-3341
Cost: To be determined (< $10)
Description: *A technical report on a study of municipal wellfield contamination in a ski-resort area near Ironwood in Michigan's Upper Peninsula (19 pp., 11 figs., 37 pp. of appendices), 1993.*

Title: ***Policy Guidelines for Minimizing Environmental Impacts from Golf Course Development in Otsego County***
Organization: Northeast Michigan Council of Governments (NEMCOG)
Address: P.O. Box 457, 123 West Main Street, Old Kent Bank Professional Building, Gaylord, MI 49735, (517) 732-3551
Cost: Free
Description: *These guidelines are designed to serve as a reference for golf course siting, design and layout, and management practices to protect the environment.*

Title: ***The Use of Pattern Recognition to Study Groundwater Chemistry***
Organization: Grand Valley State University
Address: GVSU Water Resources Institute, Allendale, MI 49401, (616) 895-6611
Cost: To be determined
Description: *This report is intended for professionals but is also available to the general public.*

Displays/Models

Title: ***Groundwater Simulator II***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986.
Cost: $225.00, plus S/H
Description: *A portable (20"x13"x6") pump or bottle-fed plastic model with layered sands for realistically demonstrating groundwater flow and contamination. Manual and groundwater booklets, pump and other accessories included.*

Title: ***Instructions for Building Groundwater Models***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986
Cost: Free
Description: *Step-by-step instructions for building inexpensive groundwater models that serve as excellent education tools are provided in this document.*

Title: ***Protecting Our Public Drinking Water - The Wellhead Protection Program***
Organization: Huron River Watershed Council
Address: 1100 N. Main, Ste 210, Ann Arbor, MI 48104, (313) 769-5123
Cost: Available on loan basis
Description: *4'x 8' display describes the importance of protecting groundwater, what we can do at home and at work, and what your community is doing (i.e. developing a wellhead protection program. Can be tailored to fit individual communities and target audiences.*

Fact Sheets

Title: ***Fact Sheet for Local Governments that Own Underground Storage Tanks***
Organization: Clinton River Watershed Council
Address: 1970 E Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: One copy free
Description: *Two-page flyer about avoiding groundwater contamination from underground storage tanks.*

Title: ***Groundwater Fact Sheets***
Organization: Tip of the Mitt Watershed Council
Address: P.O. Box 300, 3264 Powell Road, Conway, MI 49722, (616) 347-1181
Cost: Free
Description: *Five one-page fact sheets are included in this series: What is Groundwater?, Nitrate Contamination, Household Hazardous Waste, Septic System Maintenance, and Fuel Storage Tanks.*

Title: ***Groundwater Facts & Trivia***
Organization: University of Michigan - Flint, Regional Groundwater Center
Address: 303 E. Kearsley, Room 518 MSB, Flint, MI 48502-2186, (810) 766-6608
Cost: Free
Description: *A two-sided sheet of bullets of information about groundwater and related contamination. Laser printed copies are available for unlimited duplication.*

Title: ***Groundwater Glossary***
Organization: University of Michigan - Flint, Regional Groundwater Center
Address: 303 E. Kearsley, Room 518 MSB, Flint, MI 48502-2186, (810) 766-6608
Cost: Free
Description: *Easy-to-understand alphabetical listing of terms often used when discussing groundwater related topics. Laser printed copies are available for unlimited duplication.*

Title: ***Groundwater: Myths or Facts?***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931, (906) 487-3341
Cost: Free
Description: *A two-page fact sheet with twelve groundwater myths/facts, including explanations and diagrams.*

Title: ***Information for Businesses with Hazardous Materials***
Organization: Clinton River Watershed Council
Address: 1970 E Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: One copy free
Description: *Four-page fact sheet about avoiding groundwater contamination.*

Title: ***Interior Floor Drains and Groundwater Protection Requirements***
Organization: Clinton River Watershed Council
Address: 1970 E Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: One copy free
Description: *Two-page flyer about avoiding groundwater contamination from interior floor drains.*

Title: ***One Step At a Time***
Organization: East Michigan Environmental Action Council (EMEAC)
Address: 21220 West 14 Mile Road, Bloomfield Township, MI 48301-4000, (810) 258-5188
Cost: Free
Description: *This series of single topic flyers details ways that individuals can change their lifestyle to help protect the environment, including alternatives to household hazardous products and oil recycling.*

Title: ***Pesticides, Fertilizers, and Lawn Care***
Organization: Clinton River Watershed Council
Address: 1970 E Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: One copy free
Description: *Two-page fact sheet for local government distribution about avoiding groundwater contamination.*

Title: ***Safer Alternatives to Hazardous Household Chemicals***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI, 49931-1295, (906) 487-3341
Cost: Free
Description: *Chart of suggested alternatives to common household chemicals compiled from several sources.*

Title: ***Ten Steps to Protect Your Drinking Water***
Organization: MSU Institute of Water Research
Address: 115 Manly Miles Bldg., 1405 S. Harrison, East Lansing, MI 48823, (517) 353-3742
Cost: Free
Description: *A one-page flyer outlining ten "groundwater friendly" practices.*

Title: ***Used-Oil Recycling***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI, 49931-1295, (906) 487-3341
Cost: Free
Description: *Listing of used motor oil collection locations in the Upper Peninsula.*

Title: ***Waste Reduction for Automotive Repair Shops***
Organization: Clinton River Watershed Council
Address: 1970 E Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: One copy free
Description: *Two-page flyer about avoiding groundwater contamination from automotive repair shops.*

Title: ***Waterford Township Zoning Ordinance Requirements for Groundwater Protection: Guidelines for Site Plan Review***
Organization: Clinton River Watershed Council
Address: 1970 E Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: One copy free
Description: *Four-page flyer about site plan reviews for groundwater protection.*

Manuals

Title: ***Agriculture's Role in Protecting Ground Water - Conservation GEM Program Manual***
Organization: Natural Resources Conservation Service
Address: c/o MSU Institute of Water Research, 115 Manly Miles Bldg., 1405 S. Harrison, MSU, East Lansing, MI 48823-5243, (517) 353-9775
Cost: $7.95 includes postage
Description: *This 76-page manual includes sections on basic hydrology and ground water flows, chemicals in the farm water cycle, methods for protection of ground water quality, bedrock and glacial geology, and glossaries of hydrologic and contaminant transport terms.*

Title: ***A Guidebook to Groundwater Resources & Education Opportunities in the Great Lakes Region***
Organization: Great Lakes Commission
Address: The Argus II Building, 400 Fourth Street, Ann Arbor, MI 48103, (313) 665-9135
Cost: $10.00
Description: *This 92-page guidebook examines physical and environmental characteristics of groundwater and identifies groundwater resource tools and information available to educators, public officials, agency representatives and communities in the Great Lakes region.*

Title: ***Otsego County Groundwater Protection Manual***
Organization: Northeast Michigan Council of Governments (NEMCOG)
Address: P.O. Box 457, 123 West Main Street, Old Kent Bank Professional Building, Gaylord, MI 49735, (517) 732-3551
Cost: Available on loan basis
Description: *This manual describes Otsego County's groundwater resources and details recommended groundwater protection strategies.*

Title: ***GET-GEM Groundwater Education Manual***
Organization: Crawford County Cooperative Extension Service
Address: 200 West Michigan Avenue, Grayling, MI 49738, (517) 348-2841
Cost: $15.00
Description: *This groundwater training manual features background information and graphics about groundwater concepts and hands-on, leadership-oriented groundwater education activities. For teens and adults.*

Title: ***Planning and Zoning for Groundwater Protection: A Guide for Local Officials***
Organization: Michigan Society of Planning Officials
Address: 414 Main Street, Suite 211, Rochester, MI 48307, (810) 651-3339
Cost: $18.00 members/agencies - $20.00 others
Description: *Handbook to assist communities develop planning and zoning programs.*

Title: ***Water Watcher Manual***
Organization: League of Women Voters - Michigan (LWVMI)
Address: 200 Museum Drive, Lansing, MI 48933-1997, 1-800-292-5823
Cost: Available on loan basis
Description: *Groundwater basics, Michigan features, regulatory highlights, community activities, and appendices are included in this five-section, three-ring binder.*

Title: ***Wellhead Protection Planning Guide for Michigan Communities***
Organization: MSU Institute of Water Research
Address: 115 Manly Miles Bldg., 1405 S. Harrison, East Lansing, MI 48823, (517) 353-9709
Cost: To be determined
Description: *Intended for local government planners, staff, leaders and community volunteers, this guidebook provides information and suggestions for beginning the process of wellhead protection planning, including sections related to building the community planning team, community team and leadership, communication, information collection and assessment, wellhead protection management, and overlay zoning districts.*

Newsletters

Title: ***Bulletins of the Municipal Forum for Groundwater Protection***
Organization: Clinton River Watershed Council
Address: 1970 E Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: Free
Description: The bulletins are produced 3-4 times per year and identify methods for local governments to prevent groundwater contamination and opportunities for local, county, and state inter-government coordination.

Title: ***GEM Notes***
Organization: Michigan State University Institute of Water Research
Address: 115 Manly Miles Bldg., 1405 S. Harrison, East Lansing, MI 48823-5243 (517) 355-0224
Cost: Free
Description: *Providing groundwater information for general audiences and updates of the GEM project activities statewide is the focus of this bi-monthly feature of the newsletter Water Impacts.*

Title: *Groundwater Forum*
Organization: University of Michigan - Flint, Regional Groundwater Center
Address: 303 E. Kearsley, Room 518 MSB, Flint, MI 48502-2186, (810) 766-6608
Cost: Free
Description: *General groundwater-related information is provided in this quarterly newsletter, which is especially pertinent to the Saginaw Bay area, but also contains valuable information for other areas.*

Title: *GEM On Tap*
Organization: Western Michigan University Regional GEM Center
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4936
Cost: Free
Description: *Information on groundwater, particularly in southwest Michigan, and updates about groundwater education and protection activities at WMU are provided in this publication.*

Title: *Wellhead Protection Bulletin*
Organization: Tri-County Regional Planning Commission
Address: 913 W. Holmes Road, Suite 201, Lansing, MI 48910, (517) 393-0342
Cost: Free
Description: *This bulletin is a two-page, monthly publication for local officials and citizens in Clinton, Ingham and Eaton counties and features updates of progress in the development of a regional wellhead protection program for the tri-county area.*

Title: *Wellspring*
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI, 49931-1295, (906) 487-3341
Cost: Free
Description: *A quarterly newsletter presenting information on groundwater, drinking water, waste reduction/recycling, and related issues. Focus is on Michigan's Upper Peninsula, but applicable elsewhere.*

Pamphlets

Title: *City of Ann Arbor's Wellhead Protection Program*
Organization: Huron River Watershed Council
Address: 1100 N. Main, Ste 210, Ann Arbor, MI 48104, (313) 769-5123
Cost: Free
Description: *Targeted to small businesses, this guide describes the community's Wellhead Protection Program, and how small businesses can protect drinking water through pollution prevention strategies.*

Title: ***Do You Think That Groundwater...***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931-1295 (906) 487-3341
Cost: Free
Description: *A brochure discussing general groundwater perceptions, myths, sources of contamination, and ways citizens can help protect groundwater.*

Title: ***Groundwater and You***
Organization: Delta-Menominee District Health Dept. Groundwater Education Center
Address: 2920 College Ave., Escanaba, MI 49829-9592 (906) 786-4111
Cost: Free
Description: *Basic groundwater concepts, the importance of groundwater protection, and the activities of the Delta-Menominee Groundwater Education Center are explained in this two-fold brochure.*

Title: ***Groundwater & Public Policy***
Organization: Freshwater Foundation
Address: 725 County Road 6, Wayzata, MN 55391, (612) 449-0092
Cost: $15.00 per set. Volume discounts available
Description: *A series of seventeen leaflets on rural groundwater quality issues and policies. Topics include How Contaminants Reach Groundwater, The Costs of Groundwater Contamination and Community Wellhead Protection Programs.*

Title: ***Groundwater in Michigan: A Primer***
Organization: League of Women Voters - Michigan (LWVMI)
Address: 200 Museum Drive, Lansing, MI 48933-1997, 1-800-292-5823
Cost: Free
Description: *This four-page publication in "newspaper" format describes the groundwater basics, remedial and protection actions, and outlines legislation that impacts groundwater.*

Title: ***Household Hazardous Waste Series***
Organization: Michigan State University Extension
Address: 305 Natural Resources Building, East Lansing, MI 48824, (517) 355-9578
Cost: Free
Description: *Seven pamphlets are included in this household hazardous waste series, each focusing on disposal of typical household and small business products such as gasoline, paints, automotive products, and aerosols.*

Title: ***How Much Can Groundwater Contamination Cost Your Business?***
Organization: Tri-County Regional Planning Commission
Address: TCRPC Groundwater Resource Center, 913 W. Holmes Rd., Suite 201, Lansing, MI 48910, (517) 393-0342
Cost: Free
Description: *Targeted toward business owners, this brochure provides basic information on groundwater and contamination, as well as examples of costs to businesses of pollution and prevention strategies that can be taken to avoid contamination of groundwater.*

Title: ***How to Keep your Home from Becoming a Hazardous Waste Site***
Organization: Michigan State University Extension
Address: 305 Natural Resources Building, East Lansing, MI 48824, (517) 355-9578
Cost: Free
Description: *This three-fold brochure opens to an illustrated chart which lists the most effective means for disposing of household hazardous waste.*

Title: ***Landfills Are Not Open Dumps!***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931-1295 (906) 487-3341
Cost: Free
Description: *An illustrated brochure that describes the features, including leachate collection, that distinguish modern landfills from open dumps.*

Title: ***Plugging Abandoned Wells***
Organization: Natural Resources Conservation Service
Address: c/o MSU Extension Bulletin Office (Bulletin # WQ40), Room 10B Agriculture Hall, MSU, East Lansing, MI, 48824 (517) 355-0240
Cost: $.60 per copy
Description: *This 6-page bulletin covers proper well abandonment procedures in Michigan, including requirements, reporting, costs and identification of abandoned wells.*

Title: ***Protecting Your Groundwater in Washtenaw County***
Organization: Washtenaw County Environmental Services
Address: 4101 Washtenaw, Ann Arbor, MI 48107, (313) 971-6815
Cost: Free
Description: *This brochure highlights the PEP (Planning, Education, and Practice) for groundwater quality program and lists governmental agencies responsible for groundwater protection in Washtenaw County.*

Title: ***Protecting Groundwater: Tools for Action***
Organization: Clinton River Watershed Council
Address: 1970 E. Auburn Road, Rochester Hills, MI 48307, (810) 853-9580
Cost: $1.40
Description: *A coordinated set of four flyers intended for use by community leaders in educating and acting toward local groundwater protection. (1) "Understanding Groundwater" - for self-education; (2) "What You Can Do at Home to Protect Your Drinking Water"; (3) "Working With Others to Protect Groundwater" (suggested group projects); (4) "Local Governments and Groundwater Protection" (and checklist for a community profile).*

Title: ***Village of Milford's Wellhead Protection Program***
Organization: Huron River Watershed Council
Address: 1100 N. Main, Ste 210, Ann Arbor, MI 48104, (313) 769-5123
Cost: Free
Description: *Targeted to small businesses, this guide describes the community's Wellhead Protection Program, and how small businesses can protect drinking water through pollution prevention strategies.*

Title: ***Village of Pinckney's Wellhead Protection Program***
Organization: Huron River Watershed Council
Address: 1100 N. Main, Ste 210, Ann Arbor, MI 48104, (313) 769-5123
Cost: Free
Description: *Targeted to small businesses, this guide describes the community's Wellhead Protection Program, and how small businesses can protect drinking water through pollution prevention strategies.*

*Posters**

Title: ***Aquifer Vulnerability to Surface Contamination Map***
Organization: Center for Remote Sensing, Michigan State University
Address: 115 Manly Miles Bldg, 1405 S. Harrison, East Lansing, MI 48823-5243, (517) 353-7195
Cost: Free
Description: *A color map showing the relative vulnerability of Michigan's groundwater to contamination from surface sources.*

Title: ***Groundwater...is an Essential Part of Your Health***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986
Cost: $1.00 to cover mailing costs
Description: *Actions that individuals, industry, and farmers can take to protect groundwater are included on this poster.*

*See also Student/Teacher Resources

Student/Teacher Resources

Title: *Classroom GEMS*
Organization: Science and Environmental Education-North (SEE-North)
Address: 03001 Church Rd., Petoskey, MI 49770
(616) 348-9700
Cost: $20.00 per notebook
Description: *Classroom GEMS is a K-6 notebook which includes 23 hands-on activities, poster and game board. Classroom GEMS introduces, develops, and reinforces concepts related to groundwater and corresponds with the state science objectives.*

Title: *"Excuse Me Sir, That's My Aquifer!"*
Organization: Au Sable Institute of Environmental Studies
Address: 7526 Sunset Trail, N.E., Mancelona, MI 49659, (616) 587-8686
Cost: $10.00, plus 6% state sales tax
Description: *Lively songs about groundwater and related environmental issues are featured on this cassette tape, which is accompanied by a 20-page booklet containing water facts, hands-on activities, and action steps to protect water.*

Title: *GEE-WOW! Adventures in Water Education*
Organization: Ecology Center of Ann Arbor
Address: 417 Detroit Street, Ann Arbor, MI 48104, (313) 995-5888
Cost: $12.00/1, $55.00/5, plus 10% S/H
Description: *Twenty-eight inexpensive hands-on activities for K-6 students are included in this 80-page book. Topics include the water cycle, where water is found underground, how water moves underground, and how individuals can protect groundwater. The activities relate to science, social studies, art, and language arts.*

Title: *GEE-WOW! Adventures in Water Education (Newsletter)*
Organization: Ecology Center of Ann Arbor
Address: 417 Detroit Street, Ann Arbor, MI 48104, (313) 995-5888
Cost: Free
Description: *This semi-annual newsletter for elementary school educators includes basic groundwater information, inexpensive experiments, and groundwater games for classroom use.*

Title: ***Groundwater Defender Series***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986
Cost: $5.00 plus shipping
Description: *This set of three colorful posters for elementary grades features a robot-like "Groundwater Defender" which stress contamination issues and groundwater protection.*

Title: ***Groundwater Education (A Unit Designed for the AuSable Institute site)***
Organization: AuSable Institute of Environmental Studies
Address: 7526 Sunset Trail N.E., Mancelona, MI 49659, (616) 587-8686
Cost: $4.00
Description: *This unit outlines youth groundwater education activities for the AuSable Institute of Environmental Studies site. Compiled materials for pre- and post- groundwater lessons and a bibliography are also included.*

Title: ***Groundwater Explorations***
Organization: Western Michigan University/Kalamazoo Nature Center
Address: Kalamazoo Nature Center, 7000 North Westnedge Avenue, Kalamazoo, MI 49008, (616) 381-1574
Cost: $25.00
Description: *This 3-ring notebook offers a wide range of hands-on student activities for environmental educators. The activities help students to understand effects individual actions have on the environment and what they can do to make a difference.*

Title: ***Groundwater Transparency Set***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986
Cost: $35.00 plus postage
Description: *A teaching notebook which includes eighteen overhead transparencies (11 in color) on groundwater, emphasizing Michigan with easily understandable explanations and classroom activities.*

Title: ***Henry Goes Underground***
Organization: Western Michigan University
Address: Institute for Water Sciences, WMU, Kalamazoo, MI 49008, (616) 387-4986
Cost: $4.00 plus S/H. Quantity discounts available
Description: *This 32-page paperback book for elementary age students follows Henry Hydro Oxide on his adventures through the water cycle. A glossary and hands-on activity are also included.*

Title: *It's Found Underground: Groundwater, Our Buried Treasure*
Organization: Ecology Center of Ann Arbor
Address: 417 Detroit Street, Ann Arbor, MI 48104, (313) 995-5888
Cost: $39.95/1, $179.95/5, plus 10% S/H
Description: *Youths in upper elementary and middle school are the audience for this videotape which includes three, five-minute segments on: Groundwater, Our Buried Treasure; Water Conservation and Pollution; Solid Waste and Groundwater; and a fourth segment providing information for teachers.*

Title: *Making a Groundwater Model!!*
Organization: MSU Institute of Water Research
Address: 1405 S. Harrison, East Lansing, MI 48823, (517) 353-3742
Cost: Free
Description: *Developed by MSU Extension, this paper outlines a short activity that can be done as either "hands-on" or as a demonstration to teach the basics about groundwater. For elementary school children.*

Title: *The Groundwater Education Wizard (GEWIZ)*
Organization: Grand Valley State University
Address: GVSU Water Resources Institute, Allendale, MI 49401, (616) 895-6611
Cost: To be determined
Description: *This interactive **computer program** combines text, color graphics, animation, sound and music to introduce students to groundwater concepts.*

Title: *The Groundwater Primer*
Organization: Grand Valley State University
Address: GVSU, Water Resources Institute, Allendale, MI 49401, (616) 895-6611
Cost: To be determined
Description: *"The Groundwater Primer" **computer software** introduces students to groundwater principles through the use of word definitions.*

Title: *The Thirsty Wizard*
Organization: Grand Valley State University
Address: GVSU, Water Resources Institute, Allendale, MI 49401, (616) 895-6611
Cost: To be determined
Description: *"The Thirsty Wizard" is a **computer game** similar to hangman which focuses on words related to groundwater.*

Title: *Water Cycling with Drip and Drop*
Organization: Western Michigan University/Kalamazoo Nature Center
Address: Kalamazoo Nature Center, 7000 North Westnedge Avenue, Kalamazoo, MI 49008, (616) 381-1574
Cost: $40.00
Description: *This **slide/tape program**, designed for elementary and middle school students, defines groundwater and the water cycle, the importance of groundwater in Michigan's ecosystem, and groundwater's vulnerability. Also available in VHS format.*

Title: *Water for the 21st Century: Things You Can Do to Protect Our Water*
Organization: Grand Valley State University
Address: GVSU, Water Resources Institute, Allendale, MI 49401, (616) 895-6611
Cost: To be determined
Description: *Children aged 4-10 are the audience for this coloring book which gives some helpful tips on water conservation and pollution prevention.*

Other Resources

Title: *Directory of Water Education Programs in Southeast Michigan*
Organization: Southeast Michigan Regional Center for Groundwater Education (SER-GEM)
Address: Eastern Michigan University, 34 N Washington, Ypsilanti, MI 48197 (313) 487-4322
Cost: One copy free, additional copies $1.00
Description: *This 40-page booklet provides information on resources and organizations conducting water education programs in southeast Michigan.*

Title: *GEMNET User Documentation*
Organization: MSU Institute of Water Research
Address: 115 Manly Miles Bldg., 1405 S. Harrison, East Lansing, MI 48823, (517) 353-3742
Cost: Free
Description: *This set of six sheets details how to access and use GEMNET, a PC-based Bulletin Board System that allows for electronic communication among organizations and individuals interested in drinking water protection and education, as well as other environmental issues.*

Title: *Groundwater Bumper Sticker*
Organization: Michigan State University Institute of Water Research
Address: 115 Manly Miles Bldg, 1405 S. Harrison, East Lansing, MI 48823-5243, (517) 353-3742
Cost: $.50 per sticker
Description: *"Protect Groundwater...It's Your Drinking Water" is the slogan of this two-color bumper sticker.*

Title: *Groundwater Educational Folder*
Organization: Northeast Michigan Council of Governments (NEMCOG)
Address: P.O. Box 457, 123 West Main Street, Old Kent Bank Professional Building, Gaylord, MI 49735, (517) 732-3551
Description: *A variety of educational information on groundwater and related topics useful for dissemination at presentations, fairs, etc. is provided in the folder.*

Title: *Groundwater Reference Guide*
Organization: Michigan State University, Institute of Water Research
Address: 115 Manly Miles Bldg, 1405 S. Harrison, East Lansing, MI 48823-5243, (517) 353-3742
Cost: One copy free, additional copies $.75
Description: *This easy-to-read 26 page annotated bibliography in a booklet format provides information on 16 topics related to groundwater.*

Title: *Groundwater References*
Organization: Western Michigan University/Kalamazoo Nature Center
Address: Kalamazoo Nature Center, 7000 North Westnedge Avenue, Kalamazoo, MI 49008, (616) 381-1574
Cost: $2.00
Description: *This listing includes reference material on groundwater and related topics from a variety of sources.*

Title: *Groundwater-related Educational Materials Ordering Guide*
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931, (906) 487-3341
Cost: To be determined (< $10)
Description: *An 86-page listing of ordering information for more than 850 groundwater, drinking water, waste reduction, and other environmental reference materials. Updated, 1994.*

Title: *Groundwater Programs in the Great Lakes: A Networking Resource*
Organization: Freshwater Foundation
Address: Spring Hill Center, 725 County Road Six, Wayzata, MN 55391, (612) 449-0592
Cost: $14.00
Description: *Written for groundwater professionals, this 57-page report includes profiles of innovative groundwater research projects, education programs, and management efforts, as well as a directory of contacts in environmental groups, local, state and federal agencies and citizen groups working for groundwater protection in the Great Lakes.*

Title: *Oil Change and Recycling Folder*
Organization: East Michigan Environmental Action Council (EMEAC)
Address: 21220 West 14 Mile Road, Bloomfield Township, MI 48301-4000, (810) 258-5188
Cost: One folder free
Description: *This quick reference folder for autos provides oil change and recycling drop-off information. The folder fits in a glove compartment and is suitable for holding additional auto information.*

Title: ***The Groundwater-Related Educational Materials Ordering Guide***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931-1295 (906) 487-3341
Cost: Free
Description: *A 40-page listing of ordering information for groundwater and general environmental reference materials which is updated quarterly.*

Title: ***Sharon Township, a Profile of Geological and Hydrological Conditions***
Organization: Southeast Michigan Regional Center for Groundwater Education (SER-GEM)
Address: Eastern Michigan University, 34 N Washington, Ypsilanti, MI 48197 (313) 487-4322
Cost: $15 per copy including maps
Description: *This report documents the implementation of a GIS based water quality analysis and water resources protection process. The analysis and recommendations serve as a model for other townships.*

Title: ***Waste Reduction and Management Program Library Listings***
Organization: Grand Valley State University
Address: GVSU, Water Resources Institute, Allendale, MI 49401, (616) 895-6611
Cost: To be determined
Description: *This is a listing of references which includes those that deal with groundwater pollution prevention planning.*

Title: ***Water Wisdom***
Organization: Michigan State University Institute of Water Research
Address: 115 Manly Miles Bldg, 1405 S. Harrison, East Lansing, MI 48823-5243, (517) 355-0224
Cost: Free
Description: *"Water Wisdom" is a series of 10 one-page games and quizzes for all ages covering topics related to groundwater.*

Title: ***Wellspring Newsletter Article Reprints***
Organization: MTU Regional GEM Center
Address: Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931, (906) 487-3341
Cost: Free
Description: *Topics include: septic tank maintenance, business waste reduction and energy efficiency, road deicer update (Oct '94); abandoned well plugging, health department groundwater professionals, antifreeze recycling (July '94); road deicing debate, soy-based printing inks, used-oil and oil-filter recycling update (Jan '94); underground pollution cleanup, Michigan DNR groundwater professionals, groundwater in the Clean Water Act (Oct '93); landfills (July '93); water witching, iron and manganese in drinking water (Apr '93); drinking water testing, water treatment (Jan '93); organic yard care, non-farm pesticide use, used-oil recycling (July '92).*

Groundwater Education and Protection Programs

Project Summaries of the
Groundwater Education in Michigan (GEM) Program
and Related Initiatives

AuSable Institute of Environmental Studies

The AuSable Institute is dedicated to environmental education through hands-on education and training. Groundwater education has been incorporated into the Institute's community and school programs, particularly for 5th through 12th graders. A highlight is the on-site well field constructed to provide students with hands-on education about groundwater and the cassette tape produced of environmental songs entitled, "Excuse Me Sir, That's My Aquifer." College students and area citizens are also reached through the Institute's efforts.

David Mahan, AuSable Institute of Environmental Studies, 7526 Sunset Trail N.E., Mancelona, MI 49659, (616) 587-8686

Central Michigan District Health Department (CMDHD)

CMDHD has worked with area water well drillers and local government representatives to act on behalf of improving and protecting the groundwater resource. The goals have been to help well drillers increase the accuracy of their submitted well logs and their understanding of groundwater; provide local government officials with the information and assistance necessary to initiate ordinances to protect groundwater quality; and undertake computer mapping of groundwater data.

Mark Lowe, Central Michigan District Health Department, 1222 North Drive, Mt. Pleasant, MI 48858, (517) 773-5921

Chippewa County Health Department

Collecting and compiling data for environmental planning and implementing a groundwater education program throughout the region has been the focus of this project, in cooperation with the Regional Planning and Development Commission. The Chippewa County Health Department is currently focusing on three priority areas: 1) providing drinking water quality information to clients in health service programs through local health departments, doctors' offices and tribal health centers and clinics; 2) addressing surface water intake concerns in cooperation with Canadian health units on the northern side of Lake Superior; and 3) encouraging local groups and agencies to place local drinking water issues on their agendas.

Michelle Ribant, Chippewa County Health Department, Environmental Health, 139 Arlington Street, Sault Ste. Marie, MI 49783, (906) 635-3620

Clinton River Watershed Council

The Council specifically targets those individuals who implement local zoning ordinances and groundwater protection plans: locally elected officials. CRWC has organized a Municipal Forum on Groundwater Protection, including officials from twelve core communities in the Clinton River watershed, to encourage more involvement of local officials in groundwater protection activities. A number of publications have been developed, including "Site Plan Review and Groundwater Protection," "Small Business Guide to Secondary Containment," and "Protecting Groundwater: Tools for Action."

Erich Ditschman, Clinton River Watershed Council, 1970 E. Auburn Road, Rochester Hills, MI 48307-4803, (810) 853-9580, FAX (810) 853-0486

Crawford County Board of Commissioners

The Michigan 4-H youth program, with leadership from Crawford County and Michigan State University Extension, have linked groundwater education and leadership training in northern Michigan. County teams of youths and adults have been formed and members have participated in training sessions designed to build their leadership skills and ability to initiate community groundwater programs. An excellent, youth-targeted video entitled "Teen News Network: Groundwater Update" and a leadership training guidebook have been produced as part of this project.

Doug Hyde, Crawford County Extension, 200 West Michigan Avenue, Grayling, MI 49738, (517) 348-2841

Delta-Menominee District Health Department

A Groundwater Education Center has been established at the Delta-Menominee District Health Department in northern Michigan focusing on three activities: 1) land use planning and zoning decisions; 2) agriculture source contamination; and 3) community and individual education. A major goal of the project is to encourage local officials of Delta and Menominee Counties to incorporate groundwater protection into their future plans and activities. The Center is currently working with area schools to integrate geographic information systems (GIS) and global positioning systems (GPS) into a multi-disciplinary curriculum, primarily at the secondary levels.

Laurie Mosher, Delta-Menominee District Health Department, 2920 College Avenue, Escanaba, MI 49829, (906) 786-4111

East Michigan Environmental Action Council (EMEAC)

EMEAC has established Groundwater Leadership Teams in Livingston County and Independence Township (Oakland County) of citizen volunteers interested in learning more about groundwater protection and how to take action at the community level. The model relied on the volunteers to identify priority problems and execute plans to help solve those problems. Each team chose to address the threat to groundwater posed by household hazardous products.

Libby Harris, East Michigan Environmental Action Council, 21220 West 14 Mile Road, Bloomfield Township, MI 48301-4000, (810) 258-5188

Ecology Center of Ann Arbor

The Ecology Center's "Groundwater and Environmental Education on Wheels (GEE-WOW!)" provides entertaining and informative hands-on classes for elementary and middle school children in southeastern Michigan through the use of a traveling classroom. A K-6 groundwater activity book and a videotape for upper elementary and middle school students entitled, "It's Found Underground: Groundwater: Our Buried Treasure," and an interactive computer software program have been produced. Currently, ECAA and the Ypsilanti Branch of the National Association for the Advancement of Colored People (NAACP) are developing an ongoing partnership to encourage the participation of new groups and individuals in pollution prevention activities, especially among communities of color, and to increase community awareness and action for pollution prevention and drinking water protection in Ypsilanti.

Tara Ward, Ruth Kraut, Mike Garfield, Ecology Center of Ann Arbor, 417 Detroit Street, Ann Arbor, MI 48104, (313) 995-5888

Great Lakes Commission

The Commission has strived to coordinate groundwater education activities on a regional level, particularly at the K-12 level, and enhance environmental communication among leaders across the region. Specific activities have included hosting four regional groundwater roundtables for leading educators and officials to discuss issues of common concern and establish priorities for action, and hosting a Regional Groundwater Education Summit as a follow-up. "A Guidebook to Groundwater Resources & Education Opportunities in the Great Lakes Region" has been produced.

Tom Crane, Great Lakes Commission, The Argus II Building, 400 South Fourth Street, Ann Arbor, MI 48103-4816, (313) 665-9135

Groundwater Education in Michigan (GEM) - West

To enhance west Michigan's groundwater and environmental education, the Muskegon, Oceana and Newaygo Intermediate School Districts (ISD) have worked with the Tri-County Forestry Council (TCFC) and the West Michigan Shoreline Regional Development Commission. The focus has been to bring groundwater education into the classroom and take students into the working world where decisions are made daily that can impact groundwater. The project successfully merged groundwater and surface water into a formal educational framework. This included water testing conducted by area schools and a "student congress" to bring students together to share their experiences.

Greg Zulauf, Muskegon Area Intermediate School District, 630 Harvey, Muskegon, MI 49442, (616) 777-2637; Laurie Johnson, West Michigan Shoreline Regional Development Commission, 137 Muskegon Mall, P.O. Box 387, Muskegon, MI 49443-0387, (616) 722-7878; Tom Green, Hillsdale, Lenawee, Monroe Math/Science Center, 2345 North Adrian Hwy., Adrian, MI 49221.

Huron River Watershed Council

"Wellhead Protection-Partnerships in Practice" community demonstration projects are being initiated through the Huron River Watershed Council. The program includes: 1) providing three demonstration communities with technical assistance in delineating a wellhead protection area; 2) identifying land uses potentially threatening to groundwater within the delineated area; 3) working with communities to develop and implement management strategies to protect community water supplies; and 4) working with state, regional, county, and local authorities in developing a set of model relationships, rules and duties regarding wellhead protection.

Kris Olsson, Huron River Watershed Council, 1100 North Main, Suite 210, Ann Arbor, MI 48104, (313) 769-5123

Jackson County Intermediate School District (ISD)

To enhance groundwater education in the county, Jackson ISD has worked cooperatively with the Ecology Center of Ann Arbor to host Groundwater Festivals for fifth graders. To broaden the impact of the festival, the project has: 1) conducted parent/teachers' workshops before the festival; 2) encouraged and trained high school students to staff learning stations at the festival; and 3) made groundwater education materials and concepts accessible to teachers.

Bob Stowe, Jackson ISD, 6700 Browns Lake Road, Jackson, MI 49201, (517) 787-2800

Kalamazoo County Extension
Kalamazoo County Extension has worked with various educational methods and audiences to evaluate the most effective means of teaching about groundwater. Designing workshops, displays, handouts and a mass media campaign, and implementing a groundwater curriculum into Schoolcraft schools have been some of the strategies undertaken. Educational materials for diverse audiences have been developed, including a book for lower-elementary students entitled "Henry Goes Underground."

Patricia A. Chilton-Stringham, 2290 Quincy, Portage, MI 49002, (616) 323-3198

League of Women Voters - Michigan (LWVMI)
LWVMI has helped local Leagues organize, educate, and train groups of "Water Watchers" to lead their communities in monitoring decisions that affect groundwater. The League has developed a groundwater primer and groundwater leadership manual and has successfully used cable television as a means to promote their activities and groundwater education. "Drinking Water: Quality on Tap," a half-hour broadcast-quality video and companion guidebook have also been produced. Information on drinking water issues is also made available through the League's Citizen's Advisory Center, which includes an "800" phone line for assistance.

Marian Bendixsen, League of Women Voters, 912 Hopkins St., Mt. Pleasant, MI 48858, (517) 773-9719

Marquette County Health Department
The Marquette County Groundwater Center has been established to initiate a county-wide groundwater awareness campaign aimed at the general public, homeowners, local government officials, realtors, and planning and zoning professionals. Emphasis has been on hard-to-reach populations, such as lower income, unemployed, and K-12 students. Information developed through a geographic information system (GIS) is being used by local officials for land use decisions, and a groundwater display for the Upper Peninsula Children's Museum is being developed.

Jane Surrell, Marquette Co. Health Dept., 184 U.S. Highway 41, Negaunee, MI 49866, (906) 475-4999

Michigan Department of Natural Resources
The development and institutionalization of a statewide network of local users of digital groundwater information is the goal of this project, which emphasizes state-local partnerships. The Michigan DNR, in cooperation with local and regional organizations, is working to standardize the groundwater database development process in Michigan. Activities have included conducting a user needs assessment, fostering a statewide users network and providing training and technical expertise to network members.

Shirley Businski, Michigan DNR, P.O. Box 30028, Lansing, MI 48909, (517) 334-6912

Michigan Environmental Council
MEC has cooperated with the Ohio Environmental Council (OEC), the Hoosier Environmental Council (HEC) and the Illinois Environmental Council (IEC) on the "Great Lakes Citizens' Groundwater Protection Project." A major focus has been to improve the effectiveness of citizen leaders in addressing groundwater concerns by forming citizen leadership teams for each state. A video entitled "Groundwater Protection: It's in Your Hands," and a booklet entitled "Groundwater at Risk: A Citizen's Guide" have been produced by MEC.

Carol Misseldine, Michigan Environmental Council, 115 W. Allegan, Suite 10B, Lansing, MI 48933, (517) 487-9539

Michigan Geographic Alliance (MGA)
Educators and groundwater specialists have cooperated to integrate groundwater lessons into upper elementary geography curriculum in the eight Great Lakes states. Selected representatives from each state have been trained about groundwater concepts and helped to develop a geography unit on groundwater. These educators are committed to training teachers in their state to use the materials in their classrooms.

Mike Libbee, Michigan Geographic Alliance, Central Michigan University, Department of Geography, Mt. Pleasant, MI 48859, (517) 774-3723

Michigan Legislative Council
Developing new methods and standards for geographic data exchange, as well as the application of data in state and local decision making is the focus of this project known as IMAGIN (Improving Michigan's Access to Geographic Information Networks). The Legislative Service Bureau, the Library of Michigan, Michigan State University and the Department of Natural Resources (DNR) are conducting this unique multi-agency effort in computer mapping and data exchange. IMAGIN is also working toward cooperative development of public computer systems so that, ultimately, all citizens will have the ability to directly review mapped information about state and local natural resources.

Joe VanderMeulen, Legislative Service Bureau, P.O. Box 30036, Lansing, MI 48909, (517) 373-3028

Michigan Society of Planning Officials (MSPO)
MSPO has focused on educating local decision makers about planning and zoning for groundwater protection, and is assisting three pilot counties (Manistee, Ottawa, and Saginaw) in building county/local partnerships for the development of a coordinated and comprehensive intergovernmental program for groundwater protection that best suits the needs of each county. An objective of each county project will be to demonstrate ways in which Geographic Information Systems, linked to groundwater quality data, can help improve local government decisions about groundwater protection. An excellent guidebook for local officials entitled "Community Planning & Zoning for Groundwater Protection in Michigan" has been produced as part of this project.

Helen Willis, MSPO, 414 Main Street, Suite 202, Rochester, MI 48307, (810) 651-3339

Michigan State University Extension (MSUE)
To train small business and homeowners in the proper handling of hazardous wastes, MSUE local resource agents have organized workshops, responded to telephone inquiries concerning hazardous waste, and coordinated waste collection days. A key activity has been the production of educational materials, including a series of seven pamphlets which address the proper disposal of typical household and small business wastes.

Cynthia Fridgen, Michigan State University, 305 Natural Resources Building, East Lansing, MI 48824, (517) 355-9578

Mid-Michigan Environmental Action Council (Mid-MEAC)
Mid-MEAC is working collaboratively with a number of citizen environmental groups and local chapters of state and national groups found in Clinton, Eaton and Ingham counties to promote coordinated activities to protect the environment. Establishing itself as a new organization and helping to harness and support citizen activity and education on a host of issues with multi-county implications, including watershed management, solid waste and recycling, transboundary air pollution and conservation of open space, is the focus of this project.

Alice Austin, Mid-MEAC Coordinator, c/o Clean Water Action, 4990 Northwind Drive, Suite 210, East Lansing, MI 48823, (517) 337-4447

Natural Resources Conservation Service (formerly Soil Conservation Service)
Innovative educational tools developed through this project have helped soil and water conservation district personnel more effectively reach farmers and rural land owners about groundwater protection. Two videotapes which include high quality computer graphics to illustrate groundwater concepts have been produced: "Groundwater Protection: A Partnership in Agriculture" and "Agriculture and Groundwater Contamination: Problems and Prevention." An easy-to-understand manual entitled "Agriculture's Role in Protecting Groundwater" containing graphics focusing on agricultural and groundwater issues has also been developed.

Jim Stacey or Ruth Shaffer, Natural Resources Conservation Service, 1405 South Harrison Road, East Lansing, MI 48823, (517) 337-6904

Northeast Michigan Council of Governments (NEMCOG)
To help protect the water resources and public health in northeast Michigan, NEMCOG has developed model groundwater database manuals for use by local decision makers. Staff have worked with local township officials to identify groundwater protection strategies and to develop coordinated protection efforts. NEMCOG is working with the Huron Pines Resource Conservation and Development Council to build a framework to help implement these strategies in Otsego, Montmorency and Presque Isle Counties. Agencies, organizations and associations within each county are working together to establish partnership agreements to implement groundwater protection programs. NEMCOG and RC&D will work with each county's water quality committee to coordinate and implement the priority management recommendations and provide technical assistance as needed.

Diane Rekowski, Northeast Michigan Council of Governments, P.O. Box 457, 123 West Main Street Old Kent Bank Professional Building, Gaylord, MI 49735, (517) 732-3551

Northwest Michigan Council of Governments (NWMCOG)
Encouraging citizen and community leader action for groundwater protection has been the goal of NWMCOG's project, "Groundwater Protection: Education for Action." A major activity has been the development of a demonstration Geographic Information System (GIS) for Grand Traverse County. "A Property Owner's Environmental Guidebook" has been produced and distributed to realtors in cooperation with several local organizations. The project is working to strengthen the abilities of county and local units in applying GIS as a tool to improve decision making, and to foster relationships among various units of government within the region. Activities include: development of a Regional Land Information Cooperative and data infrastructure; formation of a Regional GIS Users Group; and the development of county and township/municipal Land Information Systems (LIS).

Jim Lively, Northwest Michigan Council of Governments, 3668 US 31 South, P.O. Box 506, Traverse City, MI 49685, (616) 929-5000

Northwest Michigan Resource Conservation and Development (RC&D) Council, Inc.

Focusing on three townships in northwest lower Michigan, this demonstration project has used computer technology to make land information readily accessible to the general public, local interest groups, and local officials for making land use decisions. NWMRC&DC cooperated with the Northwest Michigan Council of Governments to develop the computer-based Land Information Systems (LIS). Phases included: contacting various organizations and agencies throughout the region to demonstrate the technology; regional forums involving community leaders in discussions concerning the application of the technologies; and publishing a summary report entitled ""Information Access Systems for Community Planning."

The RC&DC has also worked on the development and implementation of a strategy for long term success of the Grand Traverse Bay Watershed Initiative, which was formed in 1990 as a local watershed management program. Goals of this project include: 1) making the Initiative self-sustaining; 2) overseeing a series of resource management and protection projects having measurable impacts on groundwater and surface water quality in the watershed; and 3) providing a model system for pollution prevention in the Great Lakes and North America.

Jim Haveman, Northwest Michigan Resource Conservation and Development Council, Inc., 3193 Logan Valley Road, Traverse City, MI 49684, (616) 946-6817; Jeanna Paluzzi, Grand Traverse Bay Watershed Initiative, 3197 Logan Valley Road, Traverse City, MI 49684, (616) 935-1514

Ottawa Soil and Water Conservation District (SWCD)

The Ottawa SWCD worked with Classroom GEMS, a groundwater education curriculum developed by Science and Environmental Education-North (SEE-North), to bring the K-6 curriculum into county schools. A Soil and Water Stewardship Week was promoted and recognized annually, which included a groundwater festival for area fourth graders, hands-on exhibits, a church stewardship program, public forums, and more. Local planners were reached through presentations and seminars focusing on groundwater protection.

Gail Brye, The Ottawa Soil and Water Conservation District, 16731 Ferris Street, Grand Haven, MI 49417, (616) 846-8770

Pullman Health Systems

Pullman Health Systems (PHS) is a migrant and community health center located in southwestern Michigan. In addition to testing area wells for nitrates, PHS has sponsored a traveling education program to focus on health educators, migrant health centers, and health departments. Information has been provided about the risks of high nitrates in groundwater, screening wells for nitrates, and educating at-risk populations about preventative health care. Migrant camp health aides have been trained about groundwater contamination, health effects, and actions to protect groundwater, and an educational videotape has been produced.

Linda Budnick-Cisco or Grace Paull, Pullman Health Systems, 5498 109th Avenue, Pullman, MI 49450, (616) 236-5021

Science and Environmental Education-North (SEE-North)

A statewide K-6 groundwater notebook featuring innovative hands-on activities, entitled "Classroom GEMS" has been developed by SEE-North. The activities help students learn about groundwater protection and have been developed using a conceptual framework established by a work group of groundwater specialists, curriculum specialists, and classroom teachers. Teacher workshops have been held and teams of teachers trained to show others how to use Classroom GEMS.

Mary Whitmore, SEE-North, 03001 Church Road, Petosky, MI 49770, (616) 348-9700

Southeastern Oakland County Healthy Lawn and Garden Project (SOCRRA)
The goal of this project is to motivate and educate citizens and landscapers regarding proper application of lawn and garden chemicals. Activities include: 1) training programs for landscapers and citizens; 2) outreach activities in 14 southeastern Michigan cities; 3) citizen volunteer outreach to gardeners; and 4) developing exhibits and educational materials such as broadcast-quality videotapes. Project partners include, among others, MSU Extension and the Detroit Landscape Association.

Lillian Dean, 10154 Lincoln Avenue, Huntington Woods, MI 48070, (810) 546-5818

Tip of the Mitt Watershed Council
The Council has conducted a groundwater protection and education program to prevent further contamination of northern Michigan's groundwater resources. A well water sampling program, a comprehensive fuel storage tank education project, a hazardous substance control program for businesses and education/coordination with local officials have been conducted to help protect groundwater. A series of five groundwater fact sheets have been produced as part of the project.

Gail Gruenwald, Tip of the Mitt Watershed Council, P.O. Box 300, 3264 Powell Road, Conway, MI 49722, (616) 347-1181

Tri-County Regional Planning Commission (TCRPC)
TCRPC has created a Groundwater Resource Center to reach area local officials, educators and citizens, as well as initiated a Geographic Information System (GIS) for use by local officials in Ingham, Eaton and Clinton Counties when making zoning and land use decisions. To build upon these efforts, TCRPC is undertaking wellhead protection activities which include: 1) the development of a regional wellhead protection plan; 2) a model township wellhead protection ordinance; and 3) the development of a Regional Groundwater Protection Authority to help sustain and institutionalize the plan.

Christine Vaidic, Tri-County Regional Planning Commission, 913 West Holmes Road, Suite 201, Lansing, MI 48910, (517) 393-0342

Washtenaw County Environmental Health, Planning, Cooperative Extension Service, and Environmental Coordination
These four organizations joined forces to help protect Washtenaw County's groundwater by implementing a Planning, Education, and Practice (PEP) for Quality Groundwater Program. PEP has provided a coordinated community-specific educational program for local officials, homeowners, agricultural operators, and other interested citizens. Educational materials have been developed, including a Macintosh-based computer program for general audiences to promote groundwater protection.

H. Leon Moore, Washtenaw County Environmental Services, 4101 Washtenaw, Ann Arbor, MI 48107, (313) 971-6815

Western Michigan University and Kalamazoo Nature Center
This project has tapped a unique resource: nature and environmental centers. Through the project, nature centers throughout Michigan have introduced groundwater education into their programming by providing hands-on activities. Six diverse nature centers have been chosen as models and include Chippewa Nature Center, Sarrett Nature Center, Kensington Metropark Nature Center, Seven Ponds Nature Center, Gillette Nature Center, and the Howard Christensen Nature Center. A groundwater trail, known as the "Fern Valley Trail," an entertaining slide show, and an activity notebook entitled "Groundwater Explorations" have been developed as part of the project.

***Don Brown**, Science for Citizens Center, Western Michigan University, Kalamazoo, MI 49008, (616) 387-2721; **Bill Rose or Beth Carpenter**, Kalamazoo Nature Center, 7000 North Westnedge Avenue, Kalamazoo, MI 49008, (616) 381-1574*

GEM REGIONAL CENTERS

These centers, located throughout Michigan, are academic institutions designated to undertake groundwater protection projects at a regional level, and provide scientific, technical and informational assistance to local groundwater projects.

Eastern Michigan University

The Southeast Regional GEM Center's (SER-GEM) Training Action Partnerships (TAP) Initiative focuses on groundwater protection as it relates to watershed management, geographic information systems (GIS) and environmental education. The TAP program is forming alliances between local governments and educational centers and encouraging integration of drinking water protection into decision making procedures and educational programs, with a specific focus on GIS technological approaches. Training sessions on computer mapping are being provided to county, and in some cases township, staff members. The results will be a set of township maps for each participating county which can be used for decision making at the local level. SER-GEM will provide technical assistance and leadership development opportunities at both the county and local government levels to promote application of these technical capabilities in the policy-making process. In addition, SER-GEM and Friends of the Rouge (FOTR) are building a partnership for community water resource education and protection. Through a water sampling program and an annual community conference, SER-GEM will interact directly with schools and community leaders to share results and discuss strategies for problem solving and pollution prevention.

Charles Monsma or Susan Nicosia, Institute for Community and Regional Development (ICARD), Eastern Michigan University, 34 North Washington, Ypsilanti, MI 48197, (313) 487-4322

Grand Valley State University Water Resources Institute

As part of its dedicated efforts to protect groundwater quality, the Water Resources Institute (WRI) has joined forces with the Ottawa County Planning Commission and Michigan Society of Planning Officials (MSPO) to implement and test groundwater protection strategies through the project "County & Local Partnership for Groundwater Protection Zoning: A Michigan Demonstration Project." This involves the development of county-local partnerships to achieve groundwater protection zoning. Activities have included: hosting a Groundwater Protection Workshop to raise the awareness of local officials; developing map products pertaining to groundwater and aquifer vulnerability; sponsoring leadership training seminars for community leaders; and forming a Citizens' Advisory Committee to assist WRI in implementing groundwater protection strategies. WRI is also preparing a manual of options for groundwater protection, identifying potential contamination sites in targeted communities, offering training to county staff in the use of computer well-log data, and making ongoing visits to community planning commissions to assist them in implementing groundwater protection strategies.

John Koches or Patti Fisher, Water Resources Institute, Grand Valley State University, Allendale, MI 49401, (616) 895-3749

Michigan Technological University

The MTU Regional GEM Center's mission is to provide objective information, educational outreach and technical assistance on drinking water and groundwater related issues. Center programs include developing drinking water educational materials and events, using geographic information systems (GIS) technology to assist local decision making, and conducting teacher-training workshops. MTU is currently working toward the development of a wellhead protection program with special emphasis on tribal communities; initiating education programs for children and young adults through a volunteer network; providing GIS technical assistance and developing model projects; and conducting community educational outreach for drinking water quality.

Neil Hutzler or Kristine Bradof, Michigan Technological University, MTU Regional GEM Center, 1400 Townsend Drive, Houghton, MI 49931-1295, (906) 487-3341

University of Michigan - Flint

By combining education, information, research, and technical assistance the Center has become a major resource for groundwater protection in east central Michigan. The Center is currently working in partnership with the Village of Elkton in Huron County, the City of Grand Blanc in Genesee County, Tyrone Township in Livingston County, and several different agencies in Lapeer County to build long-term programs for groundwater protection. This includes efforts to identify and protect wellhead protection areas (WHPA) based upon the needs and progress within each community. When completed these model communities will be used to demonstrate to other communities how to incorporate groundwater management strategies into standard planning practices and to implement programs which will help protect their drinking water from potential contamination.

Richard Hill-Rowley or Michelle Nichols, University of Michigan - Flint, Department of Resource Community Science, Flint, MI 48502-2186, (810) 766-6608

Western Michigan University Institute for Water Sciences

In its Project Beyond 2000, WMU is helping local governments along the western half of the Interstate-94 corridor to protect their water supplies by conducting research and providing technical assistance. "Community partners" have been established and committed themselves to protecting groundwater and becoming models for neighboring communities. WMU also provides expertise in: training teachers and developing groundwater curricula; producing 3-D groundwater flow simulators; analyzing geology and land uses, and analyzing existing county and state data using sophisticated computer programs. WMU also uses computer-based geographic information systems and facilitates community efforts to develop groundwater protection plans.

Lauren Hughes, Institute for Water Sciences, Western Michigan University, Kalamazoo, MI 49008, (616) 387-4936

Michigan State University Institute of Water Research

Since 1988, the MSU-IWR has helped the W.K. Kellogg Foundation to facilitate the GEM Program to help people understand the relationship between their actions and the quality of their environment, particularly groundwater. The Institute has facilitated the program by fostering communications among GEM projects across the state, including hosting conferences, developing training programs and supporting GEMNET, a PC-based electronic mail and bulletin board system.

Ruth Kline-Robach, Institute of Water Research, Michigan State University, 115 Manly Miles Building, 1405 S. Harrison Rd., East Lansing, MI 48823, (517) 355-0224.

The Groundwater Education In Michigan (GEM) Program and Related Drinking Water Protection Initiatives

= GEM Regional Center

GROUNDWATER EDUCATION MICHIGAN